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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,594	12/20/2005	David Philip Williams	034279-011	9808
21839 7590 08/08/2007 BUCHANAN, INGERSOLL & ROONEY PC POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404			EXAMINER TRAN, HOANG Q	
			ART UNIT 2874	PAPER NUMBER
			MAIL DATE 08/08/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/561,594

Applicant(s)

WILLIAMS ET AL.

Examiner

Hoang Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 03/30/2006, 05/01/2006
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 9-24, 27, and 29-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawanishi et al (US 2001/026667 A1).

In terms of claim 1, Kawanishi discloses an elongate waveguide for guiding light, comprising: a core region (Fig. 7 '61'), comprising an elongate region of relatively low refractive index; and a cladding region (62), comprising elongate regions of relatively low refractive index interspersed with elongate regions of relatively high refractive index, including, in a transverse cross-section of the waveguide, a relatively high refractive index boundary region that surrounds the core region and has either (1) at most two-fold rotational symmetry or (2) a rotational symmetry that reduces the rotational symmetry of the waveguide to at most two-fold rotational symmetry, the symmetry of the boundary region resulting at least in part from azimuthal variations therein, which are substantially

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uncharacteristic of the cladding region (the two fold rotational symmetry is visible in Fig. 7 shown by the dotted lines).

Regarding claims 2-3, the two-fold rotation symmetry at least in part due to azimuthal variations in its thickness, shape, refractive index, or other material properties (Para [0057]).

Regarding claims 9-18, the inner periphery and the outer periphery are substantially different form than the inner periphery such that the boundary region comprises a plurality of boundary cells around the core region that do not tile onto any arrangement of cells in the cladding region (see Fig. 9 and 12 and Para [0071]-[0074]). Furthermore the highest rotational symmetry that is less than or equal to two.

Regarding claims 19-24, the cladding and the core region, apart from the boundary region, has a rotational symmetry that is greater than two. Kawanishi discloses both species of a hollow core (Fig. 9) and a solid core (Fig. 12).

Regarding claim 27, 29, and 30, the waveguide exhibits two polarization states of a spatial mode of the waveguide, which are significantly different field decays at a given radial distance from the center of the waveguide (see Fig. 9). The disclosed waveguide is a fiber to be used in a communication network and optical signal processing (Para [0001]).

Claims 31-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Jakobsen et al. (US 2004/0179796 A1).

Jakobsen discloses a method of forming a photonic crystal fibre including the steps: forming a preform comprising an elongate, relatively low refractive index core

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region, and, surrounding the core region, an elongate cladding region, comprising elongate regions of relatively low refractive index interspersed with elongate regions of relatively high refractive index; forming, at the interface between the core region and the cladding region, a boundary region, comprising one or more relatively high refractive index regions, which has at most two-fold rotational symmetry due to azimuthal variations, which are uncharacteristic of the cladding region; and drawing the pre-form into a fibre, which has no more than two-fold rotational symmetry about any longitudinal axis (See Abstract and Fig. 3 and 10). The preform is formed from a plurality of elongate members at least some of which are capillaries (Abstract), in which the preform is formed by extrusion. The arrangement of the capillaries are done in a stacking manner and followed by drawing the preform stack into a fiber.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawanishi in view of Han (US 7,106,933 B2).

Kawanishi discloses the invention of claim 1, however, Kawanishi does not disclose boundary nodes around the core region wherein the nodes being joined

between two boundary veins and to at least one relatively high refractive index region of the cladding region.

Han discloses a photonic crystal fiber for high frequency transmission wherein the boundary nodes around the core region wherein the nodes being joined between two boundary veins and to at least one relatively high refractive index region of the cladding region (Figs. 2 and 8, please note the end to end of the veins joining around the core). Furthermore, the boundary region has at most two-fold rotation symmetry at least in part do to one or more boundary veins having a different thickness, shape, length, refractive index or other material property than other boundary veins (col. 2, line 65 – col. 3, line 5 and col. 7 lines 1-7). It would have been obvious to one having ordinary skill in the art to recognize the packing configuration in the instant case is a kagome lattice wherein the motivation for such configuration is high efficiency and high density packing in a confined region.

Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawanishi in view of Saitoh et al (International Topic Meeting on Microwave Photonics, November 2002).

Kawanishi discloses the invention of claim 1, however, Kawanishi does not disclose the beat length, also known as modal birefringent, is less than 10 mm at the given wavelength in the region at a given wavelength.

Saitoh disclosed experimental results of highly birefringent photonic bandgap fibers in Fig. 8 showing the modal birefringent is less than 10mm at a given wavelength. Although Saitoh does not specifically discloses the wavelength is in the region of 1550.

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However, from extrapolation, the exponential decay shows that the at 1460nm, the modal birefringent is less than 10 mm and continues to decrease, thus reads upon the claimed limitations. The motivation for disclosing such experimental results is to provide evidence that photonic crystal fiber is viable to be manufactured in place of common fiber for its high transmission and low loss.

Claim 28 rejected under 35 U.S.C. 103(a) as being unpatentable over Kawanishi in view of Hasegawa et al. (US 6,718,105 B2). Kawanishi discloses the invention of claim 1, however Kawanishi does not explicitly disclose the material volume and claimed in claim 28.

Hasegawa discloses the effective indices of the waveguide is directly proportional the volume fraction of the lower refractive index and higher refractive index material (See EQU 1 in col. 1, lines 25-61). Thus it would have been obvious to one skilled in the art to recognize the quantity of the lower refractive index material must exceed 50% in order to confine light, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233 and MPEP 2131.03 III.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoang Tran whose telephone number is 571-272-5049. The examiner can normally be reached on 9:00AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ht

Hoang Tran
AU 2874
July 31, 2007

/Sung Pak/
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Primary Examiner
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